Microfabricated Chemical Sensors for Aerospace Fire Detection Applications

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The detection of fires on-board commercial aircraft is extremely important for safety reasons. Although dependable fire detection equipment presently exists within the cabin, detection of fire within the cargo hold has been less reliable and susceptible to false alarms. A second, independent method of fire detection to complement the conventional smoke detection techniques, such as the measurement of chemical species indicative of a fire, will help reduce false alarms and improve aircraft safety. Although many chemical species are indicative of a fire, two species of particular interest are CO and CO_2.

This paper discusses microfabricated chemical sensor development tailored to meet the needs of fire safety applications. This development is based on progress in three types of technology: 1) Micromachining and microfabrication (Microsystem) technology to fabricate miniaturized sensors. 2) The use of nanocrystalline materials to develop sensors with improved stability combined with higher sensitivity. 3) The development of high temperature semiconductors, especially silicon carbide. The individual sensor being developed and their level of maturity will be presented.